Horizontal Drilling Campaign Reverses Production Decline, Achieving Average 3,188 bbl/d per Well

Real-time LWD services enable Panyu Operating Company to access and produce attic oil remaining in reservoirs in mature field offshore China.

**CHALLENGE**
Drill horizontal wells to access remaining thin oil-column reserves being squeezed by strong bottom water drive in mature oil field with declining production.

**SOLUTION**
Land and geosteer lateral drain sections using PeriScope* bed boundary mapping service and adnVISION* azimuthal density neutron service.

**RESULTS**
- Achieved average 3,188 bbl/d initial production per well and 1% water cut, exceeding set targets by 68%.
- Reversed production trend from decline to positive growth.
- Exceeded cumulative incremental oil forecast for field by 45%.

“The successful implementation of the new development strategy and the application of fit-for-purpose technologies in our mature oil field have sustained and extended production, and led to increasing the ultimate recovery and asset economics.”

Li Lin
Subsurface Manager
Panyu Operating Company

**Develop mature oil field with declining production**
The Panyu Operating Company was conducting a horizontal drilling campaign in the PY4-2 oil field to access attic oil remaining in thin reservoirs that were being squeezed by a strong bottom water drive. After a decade of intensive production, the field was in decline, water cut had reached 90%, and there was great uncertainty about the location of the fluid contacts. These issues made it essential to land and place the horizontal laterals as close as possible to the top of the reservoir to keep them above the oil/water contact (OWC).

**Use real-time LWD to land and place laterals**
The drilling team successfully landed and geosteered the horizontal laterals within a very small target window just 0.5 m below the reservoir top, using the PeriScope bed boundary mapping and adnVISION azimuthal density neutron services to guide the rotary steerable system. Real-time directional electromagnetic and wellbore imaging provided by the LWD services enabled accurate well placement, detailed description of reservoir profiles, and identification of the current OWC.

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CASE STUDY: PeriScope service helps operator reverse production decline offshore China

Increase production and reverse production decline
The first 10 horizontal wells drilled using the PeriScope and adnVISION services demonstrated the ability of the advanced LWD applications to map the distance to multiple key boundaries, including the OWC and the top and bottom of the reservoir structure. Initial production from the 10 wells, all of which were precisely placed in optimal positions for drainage, averaged 3,188 bbl/d per well with only 1% water cut.

Their combined production surpassed the set production target by 12,883 bbl/d or 68% and reversed the field’s production trend from declining to positive growth. Six months after the first horizontal well went into production, the field’s cumulative incremental oil production reached 2.1 million bbl — 45% higher than forecasted.